



IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

Appl. No. : 10/617,828 Confirmation No. 5222
Applicant : A. NAGASAKA et al.
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Titled : PERSONAL AUTHENTICATION DEVICE
TC/AU : 2185
Examiner : TBD
Docket No. : ASA-1141
Customer No.: 24956

PETITION TO MAKE SPECIAL
(ACCELERATED EXAMINATION UNDER MPEP § 708.02(VIII))

MAIL STOP PETITIONS

Commissioner for Patents
P.O. Box 1450
Alexandria, VA 22313-1450

Sir:

The Applicants petition the Commissioner to make the above-identified application special in accordance with 37 CFR §1.102(d). In support of this Petition, pursuant to MPEP § 708.02(VIII), Applicants state the following.

(A) REQUIRED FEE

This Petition is accompanied by the fee set forth in 37 CFR § 1.117(h).

Payment of the fee has been made in the manner set forth below in Section (G).

(B) ALL CLAIMS ARE DIRECTED TO A SINGLE INVENTION

Following the Preliminary Amendment filed on the same date as this paper, claims 20-43 are pending in the application. All the claims of the application are directed to a single invention. If the Office determines that all claims in the application are not directed to a single invention, Applicant will make election without traverse as a prerequisite to the grant of special status in conformity with established telephone restriction practice.

As set forth in the newly added independent claims 20, 25, 32 and 37, the invention is generally directed to biometric identification whereby a feature of a vein pattern of a finger may be imaged and used for personal identification. Under independent claim 20, the invention is a personal identification apparatus comprising: two light sources to irradiate light to a finger from two sides of the finger; an image capture unit to capture the light from the light sources transmitted through the finger; and a processing unit to cause the two light sources to irradiate the light alternately, and cause the image capture unit to capture a plurality of images at a timing of the irradiation of the light sources, wherein the processing unit extracts a feature of a vein pattern of the finger from the plurality of images captured by the image capture unit and executes personal identification using the extracted feature.

Additionally, as set forth in independent claim 25, the invention is a personal identification apparatus comprising: a light source part to irradiate a finger with light from first and second sides of the finger; an image capture unit to capture images by

the light transmitted through the finger; and a processing unit to cause the light to alternately irradiate the first side and the second side, and to cause the image capture unit to capture a plurality of images at a timing of the irradiation of the light source part, wherein the processing unit extracts a feature of a vein pattern of the finger using the images captured due to the light irradiated from the first side and the second side for personal identification.

Furthermore, under independent claim 32, the invention is a personal identification method comprising: irradiating light to a finger from two light sources disposed on two sides of the finger alternately; capturing a plurality of images by the light from the light sources transmitted through the finger at a timing of the irradiation; extracting a feature of a vein pattern of the finger from the plurality of captured images; and executing personal identification using the feature of the vein pattern extracted from the plurality of images.

In addition, under independent claim 37, the invention is a personal identification method comprising: irradiating a finger alternately from first and second sides of the finger with light; capturing images by the light transmitted through the finger a plurality of times at a timing of the irradiation; and extracting a feature of a vein pattern of the finger using the images captured due to the light irradiated from the first side and the second side.

(C) PRE-EXAMINATION SEARCH

A pre-examination search has been conducted, directed to the invention as claimed. The pre-examination search was conducted in the following US Manual of Classification areas:

| <u>Class</u> | <u>Subclass</u> |
|---------------------|---|
| 250 | 338.1, 341.1, 341.7, 341.8 |
| 340 | 5.52, 5.53, 5.82, 5.83 |
| 348 | 218.1 |
| 351 | 207 |
| 356 | 51, 66, 71, 73 |
| 382 | 115, 116, 117, 124, 125, 126, 127, 275, 284 |
| 396 | 18 |
| 902 | 3 |

Additionally, the following International Patent Classification (IPC) subclasses were searched:

| <u>Class</u> | <u>Subclass</u> |
|---------------------|------------------------|
| A61B | 5/117 |
| G06K | 9/00, 9/36 |
| G01N | 21/25, 21/35 |
| G06T | 5/50 |

Furthermore, a keyword search was conducted on the USPTO's EAST database, including the US patent database and the published patent applications database. In addition, a search for non-patent literature was conducted on the IEEE xPlore and Dialog (i.e., Inspec, NTIS, Ei Compendex) online databases.

**(D) REFERENCES DEEMED MOST-CLOSELY RELATED TO THE SUBJECT
MATTER ENCOMPASSED BY THE CLAIMS**

Based upon a review of the documents located by the search and the documents already of record in the application, the references deemed to be most-closely related to the subject matter encompassed by the claims are listed below.

| <u>Document No.</u> | <u>Inventor</u> |
|---------------------|--------------------|
| US 6,088,470 | Camus et al. |
| US 6,055,322 | Salganicoff et al. |
| US 6,289,114 | Mainguet |
| US 6,459,804 | Mainguet |
| US 6,668,072 | Hribernig et al. |
| US 5,526,436 | Sekiya |
| US 5,177,802 | Fujimoto et al. |
| US 20030103686 | Ogura |
| US 5,351,303 | Willmore |
| US 5,787,185 | Clayden |
| US 6,301,375 | Choi |
| US 6,813,010 | Kono et al. |
| US 20030016345 | Nagasaka et al. |
| JP 2003-30632 | Nagasaka et al. |
| JP 11-203452 | Ito et al. |
| JP 2001-000422 | Yasukawa et al. |
| JP 2002-345953 | Terada et al. |
| JP 11-203478 | Shigemi |
| JP 2002-083298 | Miura et al. |
| US 20020028004 | Miura et al. |

These documents were made of record in the present application by the Information Disclosure Statements filed on October 5, 2005, and July 14, 2003.

Because all of the above-listed references have been made of record in the present application, in accordance with MPEP § 708.02(VIII)(D), additional copies of these documents have not been submitted with this Petition.

(E) DETAILED DISCUSSION OF THE REFERENCES

Following a brief discussion of the invention, the references deemed most-closely related are discussed below in Section (E)2, pointing out, with the particularity required by 37 CFR 1.111 (b) and (c), how the claimed subject matter is patentable over the teachings of these documents.

1. Discussion of the Invention

The present invention provides a personal identification apparatus and method that obtains an image of a vein pattern in a user's finger. In a preferred embodiment, two light sources are located on two sides of a finger. Each light source is alternately irradiates the finger and plural images are obtained. From the plural images, a feature of the finger's vein pattern may be extracted and used for personal identification. It is submitted that the cited references, whether taken individually, or in combination, fail to teach or suggest the invention as claimed in independent claims 20, 25, 32 and 37.

As set forth in claims 20, 25, 32 and 37, a first feature of the invention is directed to a personal identification apparatus and method that includes alternately irradiating a finger from two sides (e.g., first and second sides) of the finger with light.

Further, as set forth in claims 25 and 37, a second feature of the invention includes extracting a feature of a vein pattern of a finger using images captured due to light irradiated from the first side and the second side.

Similarly, as set forth in claims 20 and 32, a third feature of the invention includes extracting a feature of a vein pattern of the finger from the plurality of captured images and executing personal identification using the extracted feature.

As will be discussed in more detail below, the prior art does not teach or suggest, at a minimum, the above-described features.

2. Discussion of the References Deemed to be Most-Closely Related

The patent to Camus et al., US 6,088,470, discloses a method for removing bright spots from an image by the fusion of multiple images into a composite image. A light source 2 is energized and an image is recorded. A light source 4 is energized and an image is recorded. The two images are fused to eliminate the bright spots in each image, resulting in an image having no bright spots. The method is useful for identifying a person from images of the person's iris. (See, e.g., Figures 1-3, column 1 lines 39-48, column 2 lines 56-61, column 3 lines 40-48, column 5 lines 6-16 and column 6 lines 66-67.) However, unlike the present invention, Camus et al. do not disclose alternately irradiating two sides of a finger or extracting a feature of a vein pattern. More particularly, Camus et al. do not disclose or suggest a personal identification apparatus and method that includes alternately irradiating a finger from two sides of the finger with light, as set forth in claims 20, 25, 32 and 37. Further, Camus et al. do not disclose or suggest extracting a feature of a vein pattern of a finger using images captured due to light irradiated from the first side and the second side, as recited in claims 25 and 37, or extracting a feature of a vein pattern of the

finger from the plurality of captured images and executing personal identification, as recited in claims 20 and 32.

The patent to Salganicoff et al., US 6,055,322, discloses a similar system as in Camus et al., and is also directed to imaging an eye. The eye is illuminated by a light source 2 and a light source 4. The light sources 2 and 4 are pulsed or flashed in synchronization with exposure times of a camera 11. One light source is turned off while the other is active to eliminate specular reflections obscuring the iris, so that the entire iris may be imaged. (See, e.g., column 2, line 33, through column 3, line 37.) Thus, Salganicoff et al. also fail to teach the present invention including alternately irradiating two sides of a finger, extracting a feature of a vein pattern, or executing personal identification using a feature of a vein pattern. More particularly, Salganicoff et al. do not disclose or suggest a personal identification apparatus and method that includes alternately irradiating a finger from two sides of the finger with light, as set forth in claims 20, 25, 32 and 37. Further, Salganicoff et al. do not disclose or suggest extracting a feature of a vein pattern of a finger using images captured due to light irradiated from the first side and the second side, as recited in claims 25 and 37, or extracting a feature of a vein pattern of the finger from the plurality of captured images and executing personal identification using the extracted feature, as recited in claims 20 and 32.

The patents to Mainguet, US 6,289,114, and US 6,459,804, disclose a fingerprint reading system that uses a small sensor 10 to read a portion of a fingerprint. The sensor 10 is an integrated circuit having the shape of a small bar. When a finger 11 is pressed on an active surface of the integrated circuit at a given point in time during its relative shift on the sensor 10, multiple pressure patterns are generated and the readings are combined to form a composite image of a single fingerprint. (See, e.g., column 3, line 54, through column 4, line 64; and column 7, line 39, through column 8, line 62 of the '804 patent.) However, unlike the present invention, Mainguet does not teach alternately illuminating a finger from two sides, extracting a feature of a vein pattern, or executing personal identification using a feature of a vein pattern. More particularly, Mainguet does not disclose or suggest a personal identification apparatus and method that includes alternately irradiating a finger from two sides of the finger with light, as set forth in claims 20, 25, 32 and 37. Further, Mainguet does not disclose or suggest extracting a feature of a vein pattern of a finger using images captured due to light irradiated from the first side and the second side, as recited in claims 25 and 37, or extracting a feature of a vein pattern of the finger from the plurality of captured images and executing personal identification using the extracted feature, as recited in claims 20 and 32.

The patent to Hribernig et al., US 6,608,072, discloses a fingerprint reading system that combines multiple images to form a composite image. A number of at least partially overlapping images of the pattern which is to be recognized are

recorded. A symbolic intermediate representation is produced for each of the recorded images. Two intermediate representations are synthesized to form an overall image. (See, e.g., column 2, lines 7-67; and column 6, lines 12-34.) However, unlike the present invention, Hribernig et al. do not illuminate a finger from two sides, extract a feature of a vein pattern, or execute personal identification using a feature of a vein pattern. More particularly, Hribernig et al. do not disclose or suggest a personal identification apparatus and method that includes alternately irradiating a finger from two sides of the finger with light, as set forth in claims 20, 25, 32 and 37. Further, Hribernig et al. do not disclose or suggest extracting a feature of a vein pattern of a finger using images captured due to light irradiated from the first side and the second side, as recited in claims 25 and 37, or extracting a feature of a vein pattern of the finger from the plurality of captured images and executing personal identification using the extracted feature, as recited in claims 20 and 32.

The patent to Sekiya, US 5,526,436, discloses a device for detecting the image of a user's palm, and, particularly, a pattern of lines on the palm. The surface 3 of the detector 1 is curved, and a switch 10 is located at the fingertip. A variety of light source and image sensor configurations are proposed for irradiating the palm of a user placed on the curved surface 3 of detector 1. (See, e.g., Figure 9; column 6, lines 5-65; and column 7 lines 4-8, 39-49.) However, unlike the present invention, Sekiya does not teach alternately irradiating a finger from two sides, extracting a feature of a vein pattern, or executing personal identification using an extracted

feature of a vein pattern. More particularly, Sekiya does not disclose or suggest a personal identification apparatus and method that includes alternately irradiating a finger from two sides of the finger with light, as set forth in claims 20, 25, 32 and 37. Further, Sekiya does not disclose or suggest extracting a feature of a vein pattern of a finger using images captured due to light irradiated from the first side and the second side, as recited in claims 25 and 37, or extracting a feature of a vein pattern of the finger from the plurality of captured images and executing personal identification using the extracted feature, as recited in claims 20 and 32.

The patent to Fujimoto et al., US 5,177,802, discloses a fingerprint reading device. Two light sources 244 and 245 are provided on right and left sides of a lightguide plate. The rays of light emitted from both of the light sources are applied to a fingerprint pick-up portion 240a. This arrangement makes it possible to double the quantity of light irregularly reflected on the ridges of the fingerprint pattern and applied to the image pick-up device 243, and reduce shading caused by fingerprint pattern image, resulting in a greatly improved signal-to-noise ratio. (See, e.g., Figures 6 and 8-15; and column 12, line 50, through column 13, line 65.) However, unlike the present invention, Fujimoto et al. do not teach extracting a feature of a vein pattern, or executing personal identification using an extracted feature. More particularly, Fujimoto et al. do not disclose or suggest extracting a feature of a vein pattern of a finger using images captured due to light irradiated from the first side and the second side, as recited in claims 25 and 37, or extracting a feature of a vein

pattern of the finger from the plurality of captured images and executing personal identification using the extracted feature, as recited in claims 20 and 32.

The published patent application to Ogura, US 20030103686, also discloses a fingerprint reading device having multiple light sources 11 disposed on either side of a finger 18. A light guide 14 guides light to the finger 18 place either on a light sensor 12, or on a protector 13. After being diffused in the finger 18, the light incident on the finger 18 passes through the surface of the fingertip on which the fingerprint is present, and then enters the light sensor 12, so that a light intensity pattern in accordance with the ridges is detected by the light sensor 12. From the light intensity pattern, characteristic points of the fingerprint, such as ends of wrinkles are extracted, and by comparing the positions of characteristic points with the fingerprints among fingerprint data registered beforehand, it can be identified whether a person having a the fingerprint is the right person. (See, e.g., Figure 3 and paragraphs 29-32.) However, unlike the present invention, Ogura does not teach irradiating two sides alternately, extracting a feature of a vein pattern, or executing personal identification using the extracted feature. More particularly, Ogura does not disclose or suggest a personal identification apparatus and method that includes alternately irradiating a finger from two sides of the finger with light, as set forth in claims 20, 25, 32 and 37. Further, Ogura does not disclose or suggest extracting a feature of a vein pattern of a finger using images captured due to light irradiated from the first side and the second side, as recited in claims 25 and 37, or

extracting a feature of a vein pattern of the finger from the plurality of captured images and executing personal identification using the extracted feature, as recited in claims 20 and 32.

The patent to Willmore US 5,351,303, uses an infrared (IR) image pattern generated from a human finger as an attribute of personal identification. The IR image of an individual's finger is obtained from an Infra-Red Charge Coupled Device (IRCCD) 10. The amplitude of IR energy emanating from adjacent locations on the human body will vary in relation to the spatial arrangement of blood vessels, veins, and capillaries. Thus, the amplitude of IR energy is greater when observed at a point directly over a blood vessel while less IR energy will be observed at a point between the blood vessels. If these IR amplitude values are mapped along adjacent points over a localized area of the body, a distinct amplitude pattern will be created corresponding to the spatial arrangement of blood vessels within the sampled area. These IR amplitude patterns, corresponding to the spatial arrangement of blood vessels, will be unique to every individual just as the physical arrangements of blood vessels are unique to each individual. (See, e.g., column 6, line 34, through column 7, line 49.) Thus, while Willmore teaches sensing the spatial arrangement of blood vessels using an infrared sensor, Willmore does not teach using light to illuminate two sides of a finger alternately, or extracting a feature of a vein pattern using plural images obtained thereby for identification. More particularly, Willmore does not disclose or suggest a personal identification apparatus and method that includes

alternately irradiating a finger from two sides of the finger with light, as set forth in claims 20, 25, 32 and 37. Further, Willmore does not disclose or suggest extracting a feature of a vein pattern of a finger using images captured due to light irradiated from the first side and the second side, as recited in claims 25 and 37, or extracting a feature of a vein pattern of the finger from the plurality of captured images and executing personal identification using the extracted feature, as recited in claims 20 and 32.

The patent to Clayden US 5,787,185, discloses a method of identifying an individual based upon a vein pattern. Even illumination is provided to the back of the individual's hand by four laterally-positioned incandescent lamps 7, 9, 11, 13, which are under-run to provide an infrared-rich emission spectrum. A video camera is positioned directly over the hand for producing a raster-scan image of the back of the hand. A band-pass filter 17 extracts an infrared image and reduces the proportion of visible radiation, thereby enhancing the visibility of the subcutaneous vein pattern. (See, e.g., Figure 1; and column 2, line 7, through column 3, line 11.) Thus, while Clayden teaches the illumination of a vein pattern for identification, Clayden does not teach alternately illuminating a finger from two sides or extracting a feature of a vein pattern using plural images. More particularly, Clayden does not disclose or suggest a personal identification apparatus and method that includes alternately irradiating a finger from two sides of the finger with light, as set forth in claims 20, 25, 32 and 37. Further, Clayden does not disclose or suggest extracting a feature of a vein pattern

of a finger using images captured due to light irradiated from the first side and the second side, as recited in claims 25 and 37, or extracting a feature of a vein pattern of the finger from the plurality of captured images and executing personal identification using the extracted feature, as recited in claims 20 and 32.

The patent to Choi US 6,301,375, shows an apparatus for identifying an individual using a vein pattern. The apparatus includes a keypad 1 with which a person inputs a personal identification number; a data memory 20b for storing the persons' vein features and patterns for future recall; a CCD camera 10a which detects the portion of light source reflected from the back of the hand of the person and converts it into a video signal; a frame grabber 20c for capturing a still image from the video signal from the CCD camera 10a; a video memory 20a for temporarily storing the still image; and a microprocessor 3 which extracts a vein pattern from the temporarily stored image, extracts vein features from the vein pattern, and compares the features with the template that is previously stored in the memory 20b to determine the identity or non-identity of the person. A near-infrared light source 10b is located on both sides of the CCD camera 10a, and radiates near-infrared light toward the back of the hand through a near-infrared light filter 10c. (See, e.g., column 3, line 63, through column 5, line 45.) Thus, while Choi teaches the imaging of a vein pattern, Choi fails to teach alternately irradiating a finger from two sides, extracting a feature of a vein pattern using first and second side images, or executing personal identification using the extracted feature. More particularly, Choi does not

disclose or suggest a personal identification apparatus and method that includes alternately irradiating a finger from two sides of the finger with light, as set forth in claims 20, 25, 32 and 37. Further, Choi does not disclose or suggest extracting a feature of a vein pattern of a finger using images captured due to light irradiated from the first side and the second side, as recited in claims 25 and 37, or extracting a feature of a vein pattern of the finger from the plurality of captured images and executing personal identification using the extracted feature, as recited in claims 20 and 32.

The patent to Kono et al., US 6,813,010, assigned to the same assignee as the present invention, discloses a personal identification system that uses a vein pattern of a finger for identification. A light source unit 101 shines a light on a finger, an imaging unit 103 that captures the image of a finger, and an imaging processing unit 104 that processes captured image data. The imaging processing unit 104 performs processing necessary for identifying a captured image. Numeral 201 indicates a window through which a light from the light source transmits. A plurality of light-emitting devices, which make up the light source, are arranged according to the shape of a finger, as shown in FIG. 4. The plurality of LEDs are arranged to detect the location of a finger based on the image monitored by the imaging unit, and the light source elements to be turned on are selected to form a light source according to the thickness and the length of a finger. (See, e.g., figures 4 and 5; and column 2, line 64, through column 3, line 65.) However, Kono et al. fail to teach

alternately irradiating a finger from two sides of the finger. More particularly, Kono et al. fail to teach a personal identification apparatus and method that includes alternately irradiating a finger from two sides of the finger with light, as set forth in claims 20, 25, 32 and 37.

The published patent application to Nagasaka et al. US 20030016345, and its Japanese equivalent, JP 2003-30632, both assigned to the same assignee as the present invention, also disclose a finger identification apparatus which captures an image of a vein pattern in a user's finger. Figure 7 illustrates a configuration that includes light sources 106 incorporated in each of two light source units that extend obliquely from both sides of an opening. Figure 8 illustrates an arrangement that includes a light source 106, and a light source 800. Light source 800 provides reflective light, while light source 106 provides transmissive light. This makes it possible to visualize features, such as the fingerprint on the surface of the finger in addition to the hemal pattern. Thus, while Nagasaka et al. teach light sources on two sides of a finger, the embodiments of figures 7 and 8 fail to teach that two sides of the finger are irradiated alternately. More particularly, Nagasaka et al. do not disclose or suggest a personal identification apparatus and method that includes alternately irradiating a finger from two sides of the finger with light, as set forth in claims 20, 25, 32 and 37. Further, Nagasaka et al. do not teach extracting a feature of a vein using plural images. More particularly, Nagasaka et al. do not disclose or suggest extracting a feature of a vein pattern of a finger using images captured due

to light irradiated from the first side and the second side, as recited in claims 25 and 37, or extracting a feature of a vein pattern of the finger from the plurality of captured images and executing personal identification using the extracted feature, as recited in claims 20 and 32.

The Japanese patent publication to Ito et al., JP 11-203452, assigned to the same assignee as the present invention, shows a detector capable of accurately detecting a human vein pattern. Light from a finger 11 is separated into visible light and near infrared light by a dichroic mirror 13-1 and made incident upon a lens 15 and a near infrared image and a visible light image of the finger 11 are obtained by a CCD image pickup device 16-1. An arithmetic unit 17-1 in a controller removes an unwanted pattern from the near infrared image out of both the images to obtain a blood vessel image of the finger 11. The obtained image is collated with a blood vessel image registered in a data base 18-1 to identify a person. (See, Abstract and Figures). Thus, Ito et al. appear to teach multiple light sources, such as 12-1, 12-2 and 12-3 in FIGS. 4-6. However Ito et al. do not teach the present invention, including that two sides of the finger are irradiated alternately. More particularly, Ito et al. fail to disclose or suggest a personal identification apparatus and method that includes alternately irradiating a finger from two sides of the finger with light, as set forth in claims 20, 25, 32 and 37.

The Japanese patent publication to Yasukawa et al., JP 2001-000422, shows an apparatus that irradiates light from a light source 2 to a finger 1 each time a plurality of predetermined signals is detected. A light detection device 3 detects a pulse wave signal by receiving light that has penetrated the finger 1. The digitized pulse wave signal is subjected to extraction of characteristic values by a characteristics-extracting means 6. A data processing means 7 constitutes characteristic vectors and matrices from these values. Unknown characteristic vectors and wave shape vectors of an examinee enter a comparison/judge means 9 from the data processing means 7. Thus, each time a pulse wave signal is detected on inspection of a plurality of predetermined items, the signal is collated with registered data in the data storage means for judgment. (See, Abstract and Figures.) Thus, Yasukawa et al. teach only a single light source which is pulsed for gathering data. Accordingly, Yasukawa et al. do not disclose or suggest a personal identification apparatus and method that includes alternately irradiating a finger from two sides of the finger with light, as set forth in claims 20, 25, 32 and 37. Further, Yasukawa et al. do not disclose or suggest extracting a feature of a vein pattern of a finger using images captured due to light irradiated from the first side and the second side, as recited in claims 25 and 37, or extracting a feature of a vein pattern of the finger from the plurality of captured images and executing personal identification using the extracted feature, as recited in claims 20 and 32.

The Japanese patent publication to Terada et al., JP 2002-345953, shows an apparatus for identifying a part of a vein to facilitate injecting a needle. Light from a light source (1) with a specified wavelength is transmitted through a specified wavelength filter (2) for the light source and radiated on the spot, where a vein part (6) seems to exist, for example, on an upper arm part (5). Light from another light source (3) is also radiated on the spot for reference, and the reflected light is visually observed through a specified wavelength filter (4). The latter filter (4) is held by a holding part (7) (see, Abstract). Thus, while Terada et al. teach irradiating a spot with two light sources, Terada et al. fail to teach alternately illuminating a finger from two sides or extracting a feature of vein pattern of a finger from a plurality of images. More particularly, Terada et al. do not disclose or suggest a personal identification apparatus and method that includes alternately irradiating a finger from two sides of the finger with light, as set forth in claims 20, 25, 32 and 37. Further, Terada et al. do not disclose or suggest extracting a feature of a vein pattern of a finger using images captured due to light irradiated from the first side and the second side, as recited in claims 25 and 37, or extracting a feature of a vein pattern of the finger from the plurality of captured images and executing personal identification using the extracted feature, as recited in claims 20 and 32.

The Japanese patent publication to Shigemi, JP 11-203478, shows a method and apparatus for personal identification by obtaining plural images of a person's iris, which appears similar to Salganicoff et al. and Camus et al., discussed above. Plural

illuminations (lights) 2-1 to 2-4 are arranged about a camera 1 for photographing the person's eye. The light is emitted at various different times, and the image of the eye is photographed by the camera every time, so that plural images are acquired. Iris data is generated from a composite image of the images. (See, Abstract and Figures.) Thus, while Shigemi teaches irradiating an iris with multiple lights, Shigemi does not teach alternately irradiating a finger from two sides, or extracting a feature of a vein pattern therefrom. More particularly, Shigemi does not disclose or suggest a personal identification apparatus and method that includes alternately irradiating a finger from two sides of the finger with light, as set forth in claims 20, 25, 32 and 37. Further, Shigemi does not disclose or suggest extracting a feature of a vein pattern of a finger using images captured due to light irradiated from the first side and the second side, as recited in claims 25 and 37, or extracting a feature of a vein pattern of the finger from the plurality of captured images and executing personal identification using the extracted feature, as recited in claims 20 and 32.

The published patent application to Miura et al. US 20020028004, and its Japanese equivalent, JP 2002-083298, both assigned to the same assignee as the present invention, also disclose a finger identification apparatus which captures an image of a vein pattern in a user's finger. A vein pattern input interface 1 includes a part into which fingers are inserted, a light source 2, an optical filter 3, and a CCD camera 4. Insertion of fingers between the light source 2 and the optical filter 3 results in acquisition of a finger image by the CCD camera through the optical filter.

The received finger image is corrected for any rotation, and the person is identified by extracting a vein pattern contained in the finger image that is corrected for the rotation. (See, e.g., Abstract and paragraphs 8-9 and 27.) Thus, Miura et al. do not teach the present invention, including that two sides of the finger are irradiated alternately. More particularly, Miura et al. fail to disclose or suggest a personal identification apparatus and method that includes alternately irradiating a finger from two sides of the finger with light, as set forth in claims 20, 25, 32 and 37.

(F) CONCLUSION

As demonstrated by the above discussion, the references fail to teach or suggest, at a minimum, a personal identification apparatus and method that includes alternately irradiating a finger from two sides of the finger with light, as recited in claims 20, 25, 32, and 37, and/or extracting a feature of a vein pattern of a finger using images captured due to light irradiated from the first side and the second side, as recited in claims 25 and 37, and/or extracting a feature of a vein pattern of the finger from the plurality of captured images and executing personal identification using the extracted feature, as recited in claims 20 and 32.

Thus, it is submitted that all of these claims are patentable over the cited references taken individually, or in combination with each other. The remaining claims are dependent claims, claim additional features of the invention, and are patentable at least because they depend from allowable base claims. Accordingly, the requirements of 37 CFR §1.102(d) having been satisfied, the Applicants request

that this Petition to Make Special be granted and that the application be examined according to prescribed procedures set forth in MPEP §708.02 (VIII).

The Applicants prepared this Petition in order to satisfy the requirements of 37 C.F.R. §1.102(d) and MPEP §708.02 (VIII). The pre-examination search required by these sections was "directed to the invention as claimed in the application for which special status is requested." MPEP §708.02 (VIII). The search performed in support of this Petition is believed to be in full compliance with the requirements of MPEP §708.02 (VIII); however, Applicants make no representation that the search covered every conceivable search area containing relevant prior art. It is always possible that prior art of greater relevance to the claims may exist. The Applicants urge the Examiner to conduct his or her own complete search of the prior art, and to thoroughly examine this application in view of the prior art cited above and any other prior art that may be located by the Examiner's independent search.

Further, while the Applicants have identified and discussed certain portions of each cited reference in order to satisfy the requirement for a "detailed discussion of the references, which discussion points out, with the particularity required by 37 C.F.R. §1.111(b) and (c), how the claimed subject matter is patentable over the references" (MPEP §708.02(VIII)), the Examiner should not limit review of these documents to the identified portions, but rather is urged to review and consider the entirety of each reference.

(G) FEE PAYMENT (37 C.F.R. 1.17(h))


The fee required by 37 C.F.R. § 1.17(h) is to be paid by:

☒ the Credit Card Payment Form (attached) for \$130.00.

☐ charging Account 50-1417 the sum of \$130.00.

Please charge any shortage in fees due in connection with the filing of this paper, including extension of time fees, or credit any overpayment of fees, to the deposit account of MATTINGLY, STANGER, MALUR & BRUNDIDGE, P.C., Deposit Account No. 50-1417. A duplicate of this petition is attached.

Respectfully submitted,



Colin D. Barnitz
Registration No. 35,061

MATTINGLY, STANGER, MALUR & BRUNDIDGE, P.C.
1800 Diagonal Rd., Suite 370
Alexandria, Virginia 22314
(703) 684-1120
Date: October 5, 2005